

Claims

What is claimed is:

1. A particulate trap, comprising:
a plurality of filters; and
an air distributor having an inner tube and an outer tube, wherein the inner and outer tubes have a plurality of openings to allow exhaust flow through the plurality of filters, and one of the inner and outer tubes is rotatable to selectively block exhaust flow through at least one of the plurality of filters at a given time.
2. The particulate trap of claim 1, wherein each of the plurality of filters includes a plurality of separately regenerable filter sections.
3. The particulate trap of claim 2, further including an electrical circuit associated with each of the plurality of filter sections.
4. The particulate trap of claim 3, further including a controller in communication with the air distributor and the electrical circuit, wherein the controller is operable to cause the air distributor to block exhaust flow through at least one of the plurality of filters and operable to electrically regenerate at least one of the plurality of filter sections in response to a triggering condition.
5. The particulate trap of claim 1, further including a motor operatively connected to the air distributor and configured to rotate the one of the inner and outer tubes.
6. The particulate trap of claim 1, further including a flow tube having a plurality of openings configured to allow filtered exhaust to flow through the plurality of filters.

7. The particulate trap of claim 1, wherein the plurality of openings of the outer tube are located on an opposite side from the plurality of filters relative to an axis of the outer tube.

8. A method of removing particulates from an exhaust flow, the method comprising:

selectively directing exhaust flow to at least one filter;

filtering particulates out of the exhaust flow with the at least one filter;

rotating one of an inner tube and an outer tube of an air distributor to selectively block the exhaust flow through the at least one filter; and

selectively applying electrical current to at least one filter section of the at least one filter to cause regeneration of the at least one filter section.

9. The method of claim 8, wherein the blocking of exhaust flow and the applying of current are performed in response to a triggering condition.

10. An engine system, comprising:

an engine operable to produce an exhaust air flow;

a particulate trap operatively connected to the engine and configured to receive the exhaust air flow, the particulate trap including:

a plurality of filters; and

an air distributor having an inner tube and an outer tube, wherein the inner and outer tubes have a plurality of openings to allow exhaust flow through the plurality of filters, and one of the inner and outer tubes is rotatable to selectively block exhaust flow through at least one of the filters at a given time.

11. The engine system of claim 10, wherein each of the plurality of filters includes a plurality of separately regenerable filter sections.

12. The engine system of claim 11, further including an electrical circuit associated with each of the plurality of filter sections.

13. The engine system of claim 12, further including a controller in communication with the air distributor and the electrical circuit, wherein the controller provides a signal to cause the air distributor to block exhaust flow through at least one of the plurality of filters and operable to electrically regenerate at least one of the plurality of filter sections in response to a triggering condition.

14. The engine system of claim 10, further including a motor operatively connected to the air distributor and configured to rotate the one of the inner and outer tubes.

15. The engine system of claim 10, further including a flow tube having a plurality of openings configured to allow exhaust to flow through the plurality of filters.

16. The engine system of claim 10, wherein the plurality of openings of the outer tube are located on an opposite side from the plurality of filters relative to an axis in the outer tube.

17. A filter, comprising:
a plurality of filter elements, each of the plurality of filter elements being electrically conductive;
a holding member insulating each of the plurality of filter elements from adjacent filter elements and positioning each of the filter elements relative to the adjacent filter element; and
at least one electrical connector on each end of each of the plurality of filter elements, wherein the plurality of filter elements are electrically connected to each other on at least one end.

18. The filter of claim 17, wherein the holding member includes two substantially u-shaped metal sections welded together.

19. The filter of claim 17, wherein the holding member includes a single folded metal portion.

20. The filter of claim 17, wherein the holding member includes an extruded metal shape.

21. The filter of claim 17, wherein the holding member is cast metal and includes at least one positioning bump.

22. The filter of claim 17, wherein the holding member is non-metallic.

23. The filter of claim 17, wherein the holding member includes an impression matching a shape of the plurality of filter elements.

24. The filter of claim 17, wherein each of the plurality of filter elements includes a wire mesh.

25. The filter of claim 24, wherein the wire mesh is corrugated.

26. The filter of claim 17, wherein the holding member includes a base portion and two side portions, the two side portions being configured to block lateral movement of each of the plurality of filter elements.

27. The filter of claim 17, wherein the holding member is substantially rectangular and has a substantially constant cross-section.

28. The filter of claim 17, wherein the holding member is coated with a non-conductive material.

29. A filter, comprising:

a plurality of wire mesh elements, each of the plurality of wire mesh elements being electrically conductive; and

a holding member insulating each of the plurality of wire mesh elements from adjacent wire mesh elements and positioning each of the wire mesh elements relative to the adjacent wire mesh elements, wherein the holding member includes a base portion and two side portions, the two side portions being configured to block lateral movement of each of the plurality of wire mesh elements.

30. The filter of claim 29, wherein the side portions are sealed to the plurality of wire mesh elements.

31. The filter of claim 29, wherein the side portions are crimped to the plurality of wire mesh elements.

32. The filter of claim 29, wherein the holding member is corrugated and has a substantially constant cross-section.

33. The filter of claim 29, further including at least one electrical connector on each end of each of the plurality of wire mesh elements, wherein the plurality of wire mesh elements are electrically connected on the at least one end.

34. The filter of claim 29, wherein the holding member is coated with a non-conductive material.